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Annual dues are payable to San Diego Shell Club  
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Meeting date: third Thursday, 7:30 PM, Room 104,  
Casa Del Prado, Balboa Park, San Diego.

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## PROGRAM

### Plants, Vertebrates, Bugs and Slugs: The Crossing geographic and taxonomic Paths of Five Naturalists

Dr. Hans Bertsch will be our speaker and will discuss five naturalists who traveled through the Pacific coastal region and are famous for their contributions regarding nudibranchs and other groups of organisms. They include William H. Dall,

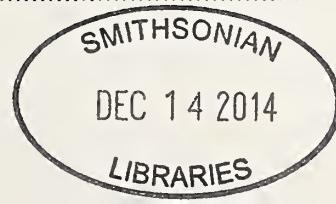
James G. Cooper, Robert E.C. Stearns, Johann F. Eschscholz and Theodore D.A. Cockerell. The early work of these individuals was a monumental contribution to the natural history of our area and the study of gastropods and bivalves.

Meeting date: January 16, 2014

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## CLUB NEWS

### The Club's Annual Holiday Party

The Club's annual holiday party Saturday evening December 7<sup>th</sup> at the Butcher Shop in Kearny Mesa, San Diego was a huge success. The "Board Room" was filled to capacity with our Club members and guests happy to be enjoying the annual party once again at the Butcher Shop. The tables, with centered mirrors, were decorated with poinsettias and shells and a Christmas tree was in the corner with gift-wrapped shells on a nearby table. Master of Ceremonies Bob Dees got the evening started with a few choice stories and a big written multiple-choice "test" for the attendees. Some of the choices for answers were quite unusual and great fun.

The delicious dinner entrée of prime rib or Mahi mahi served with wine was enjoyed by everyone and most even managed to finish the rich dessert of carrot cake. Following the meal, Bob Dees told some more good stories and then called current President Dave Waller to install the new board.

Dave thanked each of the 2013 Board members, some who have been serving for many years, and the Club Staff for their considerable work during the year. He then introduced/installed the members of the 2014 board: Larry Buck, President; Rick Negus, Vice President; Silvana Vollero, Treasurer; Marilyn Goldammer, Corresponding Secretary; and Marty Schuler, Recording Secretary. The historic gavel and the framed Charter Members plaque had already been given to the new president.



Bob Dees and Rick Negus



Dave Waller

Following this ceremony, Paul Tuskes introduced the speaker for the evening, Michael Miller, world traveler and noted underwater photographer, who presented several wonderful underwater videos, mostly of nudibranchs – those gorgeous creatures from many



Mike Miller

Carole Hertz and Marty Schuler

different areas of the world. The photography was just wonderful and the program was appreciated by all.

Then there was the traditional annual gift exchange – those who brought a gift got to choose one. It was fun to see what others got in their exchanges. This was followed by a drawing for the centerpiece poinsettias.

It was soon time to end the festivities, but, as usual, members stayed for a while to continue visiting with new friends and old. It was a very lovely time.



Ginny Herrmann and Larry Buck Bob Petroski and Silvana Vollero  
Photos by Wes Farmer

### Dues are Due

It's that time again -- a new year has arrived and dues need to be sent in for the 2014 membership. [See the front page of this issue for the cost of the dues (same as for previous years), and the Club address if you cannot attend the meetings.] The Club roster will be published in the February issue and those who have not paid by then will not be on the roster.

The Club is still awaiting the return of all the Surveys to determine the future plans for *The Festivus*. All issues will be sent as hard copies for the foreseeable future, since plans cannot be made until the majority of Survey forms are returned. Sending your survey preference online is also acceptable.

# REPORT ON THE MICRO AND MINUTE MARINE MOLLUSKS OF THE TAMARINDO AREA OF GUANACASTE PROVINCE, COSTA RICA AND COMMENTS ABOUT PANAMIC MOLLUSKS CONTAINED IN THE LACM COLLECTION

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**Abstract.** A faunal list of the micro and minute mollusks of the Tamarindo area in northern Costa Rica collected from March 8-11, 2012 is here listed. Both Kcen (1971) and Skoglund (2002) were primary sources for identification of species recorded in this project. Recently collected material in the Los Angeles County Museum of Natural History (LACM) collection from Costa Rica is not extensive with most recent stations in southern Costa Rica from 1972.

## Introduction

Costa Rica has a rich molluscan fauna and is centrally located in the Panamic Province. The most recent LACM excursion was conducted in 1972 by James McLean and Patrick LaFollete. Intertidal and SCUBA hand dredge methods were used for sampling grunge containing micro and minute marine mollusks from southern Golfo de Dulce, Puntarenas Province in southern Costa Rica. The present paper serves as a list of species collected from the sampling of intertidal grunge by hand dredge and from the undersides of intertidal rocks from Bahía Tamarindo and Playa Avellana in northern Costa Rica (Figures 1-21) in March of 2012. Due to poor weather conditions, SCUBA diving was not possible during this project. Hopefully future trips to the Tamarindo area will ensure a time when diving is favorable and would increase the understanding of the fauna. The material collected on this trip along with other Panamic mollusks studied by me in the LACM collection, some currently unidentified, need attention. Understanding the Panamic molluscan fauna of this area will require continued comprehensive studies of past, present and future molluscan populations in this region along with review of mollusk material in local museums.

## Location of Research

Guanacaste Province in northwestern Costa Rica is ideal for research as it has both sandy and rocky habi-

tats. Tamarindo has historically been known as a tourist destination and famous surfing location. The marine invertebrates have not been recently studied in detail at LACM. Two stations were sampled during March, 8-11, 2012, Bahía Tamarindo [SW12-4] and Playa Avellana [SW12-5]. My father and I arrived at Tamarindo in the late afternoon of the 8<sup>th</sup> and there was a low tide later that evening. Our hotel was situated in the entrance of town and about 100 yards from the southeast portion of Bahía Tamarindo. After settling in, I prepared my collecting gear and set out for the low tide which was at 8:59 P.M. I arrived at the southern portion of the beach at about 8 P.M. and began searching the beach with a head lamp in order to sample beach drift while also searching near rocks for other intertidal mollusks. The sampled grunge was heavily concentrated with shell material. I continued westward eventually reaching an area with intertidal rocks which appeared to have few mollusks. I then explored the rocky point at the most southwest portion of the bay and began turning rocks there with more success than from the previous area. While turning rocks to observe the mollusks beneath, I sampled rubble found underneath the rocks for later research.

On the return walk, I continued to collect beach grunge and accumulated about 255 grams of beach grit. Due to the sandy bay habitat, a large variety of bivalves were present in the sample. Upon arriving at the hotel the security patrol asked curiously what I had been doing. It was late at night and I was dressed in water proof pants, dive booties and smelling like the ocean



**Figures 1-21.** Micro and minute specimens collected during the research project from March 8-11, 2012. (1) *Lucapinella aequalis* (Sowerby, 1835), beach drift, 4.1 mm [SW 12-4]. (2) *Arene (Arene) ferruginosa* McLean, 1970, under rock, 5.2 mm [SW 12-5]. (3) *Eulithidium perforata* (Philippi, 1848), beach drift, 2.2 mm [SW 12-4]. (4) *Nodilittorina (Nodilittorina) porcata* (Philippi, 1846), beach drift, 2.8 mm [SW 12-4]. (5) *Barlecia paupercula* (C.B. Adams, 1852), under rock in rubble, 1.4 mm [SW 12-5]. (6) *Cyclostremiscus (Cyclostremiscus) panamensis* (C.B. Adams, 1852), under rock in rubble, 1.7 mm [SW 12-5]. (7) *Crepidula rostrata* C.B. Adams, 1852, beach drift, 4.4 mm [SW 12-4]. (8) *Vermicularia pellucida eburnea* (Reeve, 1842), under rock in rubble, 4.8 mm [SW 12-5]. (9) *Rissoina (Rissoina) stricta* Menke, 1850, under rock, 6.4 mm [SW 12-5]. (10) *Rissoina (Rissoina) firmata* (C.B. Adams, 1852) under rock, 4.7 mm [SW 12-5]. (11) *Hemiliostraca* sp., beach drift, 3.1 mm [SW 12-4]. (12) *Columbella sonsonatensis* (Mörch, 1860), under rock in rubble, 6.9 mm [SW 12-5]. (13) *Costoanachis lentiginosa* (Hinds, 1844), under rock in rubble, 6.4 mm [SW 12-5]. (14) *Parvanachis pygmaea* (Sowerby, 1832), under rock in rubble, 4.7 mm [SW 12-5]. (15) *Zanassarina cruentata* (Mörch, 1860), under rock in rubble, 5.6 mm [SW 12-5]. (16) *Steironepion melanostricta* (Pilsbry & Lowe, 1932), under rock, 5.4 mm [SW 12-5]. (17) *Gibberula polita* (Carpenter, 1857), beach drift, 2.0 mm [SW 12-4]. (18) *Siphonaria (Heterosiphonaria) palmata* Carpenter, 1857, beach drift, 6.3 mm [SW 12-4]. (19) *Condylocardia sparsa* Coan, 2003, beach drift, 2.0 mm [SW 12-4]. (20) *Strigatella (Strigatella) dichotoma* (Philippi, 1846), beach drift, 3.9 mm [SW 12-4]. (21) *Transenella puella* (Carpenter, 1864), beach drift, 2.7 mm [SW 12-4].

and that puzzled him. I explained I was conducting research and was out collecting in the bay. The security officer strongly advised against travelling on the beach at night because there were criminals in the city who prey on tourists that visit the beach at night. The collecting was quite good, but I did not return to that locality again due to his advice.

The following day I travelled south about 10 km to explore the intertidal region at Playa Avellana (Figure 22). Prior to travelling to Costa Rica, I had looked on Google Earth in order to find a suitable locality to collect intertidal specimens. There was a local low tide at 9:16 A.M. and I was prepared to explore the outgoing negative tide. I arrived at a parking area early on the morning of the 9<sup>th</sup> and there were few people in the area. I walked south along the beach exploring the substrate, rocks, turnable stones and sand pockets. I occasionally sampled tide-pool rubble under rocks for later observation and collected about 235 grams of grit. In addition, I took notes on my field observations and photographed nudibranchs, chiton species and other intertidal marine specimens that I could not identify. The fauna was richer in this region than in the Bahía Tamarindo area. I returned to Playa Avellana on the 10<sup>th</sup> and 11<sup>th</sup> of March and went further south each time. As I had predicted, the further south I went the more live specimens I found and the frequency of specimens increased.

### Material & Methods

During intertidal drift collecting, my preference is to use a plastic card to scrape the top layer of matrix off the drift line. This sample is stored in plastic baggies until processing. While collecting in the rocky intertidal, the preferred method is to lift rocks and observe living and dead specimens from the undersurfaces. After gently returning the rocks to the original position, any new field identifications are recorded. Occasional samples of tide-pool rubble would be sampled by use of an aquarium net. The edges of the net are treated with epoxy glue for more rigid durability. Processing the beach drift consists of rinsing the grunge in fresh water through a nested screen process (Figure 24) with larger items quickly discarded. Screened material is then dried and sifted through various sized screens. Sorted mollusks are separated and categorized by family, genus, and to species, if possible (Figures 23-26). Identified specimens are entered into the database and locality recorded. The quality and condition of some specimens made identification difficult and were therefore omitted in

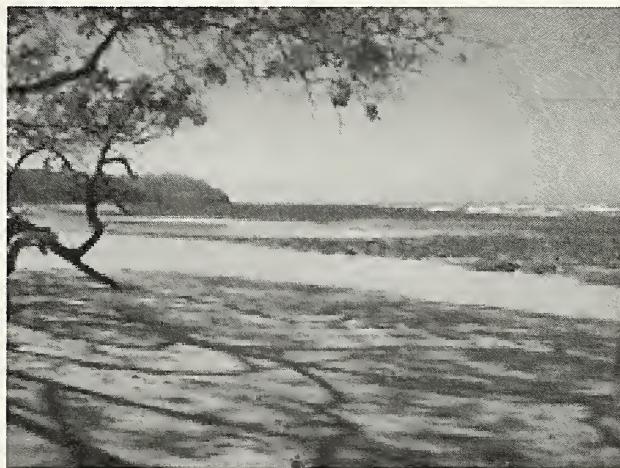
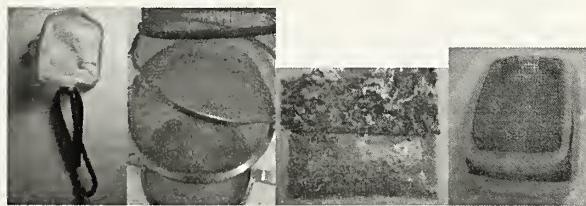


Figure 22. Sandy beach leading to intertidal rocks at Playa Avellana.



Figures 23-26. Materials used for processing micro and minute mollusks during the Tamarindo area research project. L-R: 23-Aquarium net with epoxy glue adhered to edges for durability while sampling. 24- Various sized kitchen screens used to sift specimens into appropriate sorting sizes. 25- Rubble material bagged after drying from both localities during March 2012 trip [SW 12-4 & SW 12-5]. 26- Nested screens for quick processing of larger material.

this report. As more research is conducted these specimens may get properly identified.

### Discussion of Results

Many references in addition to Keen (1971) and Skoglund (2002) were consulted for the proper identification of the species from Tamarindo listed in this paper. Of the micro and minute molluscan fauna in Keen, 64 percent are not figured (Wiedrick, 2013: 5) but Keen's comprehensive bibliography does direct one to the figured descriptions. Skoglund listed range distributions and systematic updates since 1971 but did not include illustrations. A large assortment of references is necessary for the proper identification of the species listed in this paper. These included the majority of species in the families, Cerithiopsidae (Bartsch, 1911b); Triphoridae (Bartsch, 1907); Baker,

1926); Rissoidae (Bartsch, 1911c & 1915); Barleeidae (Bartsch, 1920); Tornidae (Bartsch, 1911a); Pilsbry & Olsson, (1945 & 1952); Eulimidae (Bartsch, 1926); Turridae Conidae and Turridae (Dall, 1919) and Pyramidellidae (Dall & Bartsch, 1909). The recent publication by Coan & Valentich-Scott (2012) covers the bivalve fauna found from Baja California, México to northern Perú and made identification fairly easy. Many other authors, some including Carpenter (1857); Baker, Hanna & Strong (1938); Strong & Hertlein (1939); Hertlein & Strong (1951); Turner (1956); Palmer (1963) and Brann (1966), described new Panamic species from the general region or photographed type specimens described by, or drawn by, particular authors. Also very helpful references published in *The Festivus*, were about the Tornidae (Hertz, Myers & Gemmell, 1992) and Pyramidellidae (Skoglund, 2008).

Material observed and collected during the research project was compiled into a database and categorized in systematic order. Both localities [SW12-4 & SW12-5] revealed more than four different classes, some including, Gastropoda, Bivalvia, Polyplacophora, Scaphopoda and Octopodoidea. Shell condition of specimens collected ranged from shell fragments to live

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specimens in good condition. The confirmed identification of species from Bahía Tamarindo [SW12-4] was 120 gastropods, 4 scaphopods and 24 bivalve species. From Playa Avellana [SW12-5], 116 gastropods and 19 bivalve species were recorded. There were 187 gastropod, 4 scaphopod and 31 bivalve species recorded from both sites. Specimens of nudibranchs, chitons, live mollusks and other marine life are shown in Figures 27-36.

### Acknowledgments

I am grateful to Lindsey Groves of the Natural History Museum of Los Angeles County for his assistance with documentations for the permit and help with acquiring much needed literature. Additionally, thanks to Emeritus Curator James McLean who has also assisted throughout the last six years of my professional career of writing malacological papers and Carole Hertz for additions and suggestions and for improvements to this paper. Finally, an acknowledgement to Javier Guevara for helping expedite the collecting permit in regards to the application being lost due to an electronic hacking.

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**Figures 27-35.** Intertidal marine life photographed while researching. All at [SW12-5]. Top row, l-r. (27) cf. *Doris* sp., under rock. (28) *Octopus* sp. on underside of rock. (29) Polyplacophora sp. with several *Arca mutabilis* (Sowerby, 1833) on underside of rock. Second row, l-r. (30) Live specimen of *Cymatium (Monoplex) vestitum* (Hinds, 1844) on rock at low tide in tide pool. (31) Live juvenile specimen of *Macrocyprea cervinetta* (Kiener, 1843) with brittle star and sea eueumber. (32) Live specimen of *Muricanthus princeps* (Broderip, 1833) on rock at low tide. Bottom row l-r. (33) Nudibranch sp. under rock. (34) Crustacean sp. under rock at low tide. (35) Polyplacophora sp. under rock at low tide.

**Table 1.** A faunal list of species sampled in Bahía Tamarindo and Playa Avellana

GASTROPODA	
PROSOBRANCHIA	
PATELLOIDAE	
<i>Patelloida semirubrida</i> (Dall, 1914)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
LOTTIIDAE	
<i>Lottia mesoleuca</i> (Menke, 1851)	Tamarindo Bay [SW12-4] observed on rocks
<i>Lottia pediculus</i> (Philippi, 1846)	Playa Avellana [SW12-5] observed on rocks
<i>Lottia stipulata</i> (Reeve, 1855)	Tamarindo Bay [SW12-4] observed on rocks, Playa Avellana [SW12-5] observed on rocks
FISSURELLIDAE	
<i>Diodora inaequalis</i> (Sowerby, 1835)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] observed on rock
<i>Lucapinella aequalis</i> (Sowerby, 1835)	Tamarindo Bay [SW12-4] observed on rocks
<i>Lucapinella milleri</i> Berry, 1959	Tamarindo Bay [SW12-4] observed on rocks
<i>Fissurella (Cremides) longifissa</i> Sowerby, 1863	Tamarindo Bay [SW12-4] observed on rock, Playa Avellana [SW12-5] observed on rock
<i>Fissurella (Cremides) macrotrema</i> Sowerby, 1834	Playa Avellana [SW12-5] observed on rocks
<i>Fissurella (Cremides) microtremma</i> Sowerby, 1835	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] observed under rock
<i>Fissurella (Cremides) virescens</i> Sowerby, 1835	Playa Avellana [SW12-5] observed on rocks
<i>Fissurella (Clypidella) morrisoni</i> McLean, 1970	Tamarindo Bay [SW12-4] observed on rocks
SCISSURELLIDAE	
<i>Sinezona rimuloides</i> (Carpenter, 1865)	Playa Avellana [SW12-5] in rubble under rock
ARENEIDAE	
<i>Arene (Arene) ferruginosa</i> McLean, 1970	Playa Avellana [SW12-5] in rubble under rock
<i>Otollonia fricki</i> (Crosse, 1865)	Tamarindo Bay [SW12-4] collected in beach drift
TURBINIDAE	
<i>Pachystremiscus pachynepion</i> (Pilsbry & Olsson, 1945)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Turbo (Callopoma) saxosus</i> Wood, 1828	Tamarindo Bay [SW12-4] observed on rock, Playa Avellana [SW12-5] observed on rock
<i>Uvanilla bushii</i> (Philippi, 1844)	Playa Avellana [SW12-5] observed on rocks
<i>Tegula (Agathistoma) panamensis</i> (Philippi, 1849)	Playa Avellana [SW12-5] observed on rocks
<i>Tegula (Agathistoma) verrucosa</i> McLean, 1970	Playa Avellana [SW12-5] observed on rocks
<i>Eulithidium perforata</i> (Philippi, 1848)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Eulithidium phasianella</i> (Philippi, 1849)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
CALLIOSTOMATIDAE	
<i>Calliostoma antonii</i> (Koch in Philippi, 1843)	Tamarindo Bay [SW12-4] collected in beach drift
NERITIDAE	
<i>Nerita (Theliostyla) funiculata</i> Menke, 1851	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] observed under rock
PHENACOLEPADIDAE	
<i>Pleisothyreus puntarenae</i> (Mörch, 1860)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock

<b>TURRITELLIDAE</b>	
<i>Turritella banksi</i> Reeve, 1849	Playa Avellana [SW12-5] observed on rocks
<i>Turritella leucostoma</i> Valenciennes, 1832	Playa Avellana [SW12-5] observed on rocks
<i>Vermicularia pellucida ebiurnea</i> (Reeve, 1842)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>SILIQUARIIDAE</b>	
<i>Stephiopoma pennatum</i> Mörcz, 1860	Tamarindo Bay [SW12-4] collected in beach drift
<b>MODULIDAE</b>	
<i>Modulus disculus</i> (Philippi, 1846)	Playa Avellana [SW12-5] observed on rocks
<b>CERITHIIDAE</b>	
<i>Cerithium (Thericium) gallapaginis</i> Sowerby, 1855	Playa Avellana [SW12-5] observed on rocks
<i>Cerithium (Thericium) adustum</i> Kiener, 1841	Playa Avellana [SW12-5] observed on rocks
<b>CERITHIOPSIDAE</b>	
<i>Cerithiopsis adamsi</i> Bartsch, 1911	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cerithiopsis bristolae</i> Baker, Hanna & Strong, 1938	Playa Avellana [SW12-5] collected in rubble under rock
<i>Cerithiopsis destrugesi</i> (De Folin, 1867)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cerithiopsis sorex</i> Carpenter, 1857	Playa Avellana [SW12-5] collected in rubble under rock
<i>Cerithiopsis subgloriosa</i> Baker, Hanna & Strong, 1938	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cerithiopsis tuberculoides</i> Carpenter, 1857	Tamarindo Bay [SW12-4] collected in beach drift
<i>Seila kanoni</i> (de Folin, 1867)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Seila monterevensis</i> Bartsch, 1907	Tamarindo Bay [SW12-4] collected in beach drift
<b>TRIPHORIDAE</b>	
<i>Metaxia convexa</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Triphora paluveri</i> Strong & Hertlein, 1939	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Triphora</i> sp.	Tamarindo Bay [SW12-4] collected in beach drift
<b>SCALIOLIDAE</b>	
<i>Alaba interruptilineata</i> Pilsbry & Lowe, 1932	Tamarindo Bay [SW12-4] collected in beach drift
<b>VERMETIDAE</b>	
<i>Vermetus (Thylaeodus) indentatus</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Petaloconchus (Petaloconchus)</i> sp.	Tamarindo Bay [SW12-4] collected in beach drift
<i>Eualetes tulipa</i> (Chenu, 1843)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellino [SW12-5] in rubble under rock
<i>Serpulorbis oryzata</i> (Mörcz, 1862)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Dendropoma</i> sp.	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>LITTORINIDAE</b>	
<i>Nodilittorina (Nodilittorina) araucana</i> (d'Orbigny, 1840)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Nodilittorina (Nodilittorina) porcata</i> (Philippi, 1846)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>RISSOIDAE</b>	
<i>Alvinia (Alvinia) cf. perlata</i> (Mörcz, 1860)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Alvinia (Alvinia) nemo</i> (Bartsch, 1911)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Alvania (Alvania) inconspicua</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Rissoina (Rissoina) barthelowi</i> Bartsch, 1915	Playa Avellana [SW12-5] observed on rocks
<i>Rissoina clandestina</i> (C.B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift

<i>Rissoina (Rissoina) peninsularis</i> Bartsch, 1915	Playa Avellana [SW12-5] observed on rocks
<i>Rissoina (Rissoina) stricta</i> Menke, 1850	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Onoba fortis</i> Pilsbry & Olsson, 1941	Tamarindo Bay [SW12-4] collected in beach drift
<i>Folinia insignis</i> (de Folin, 1867)	Tamarindo Bay [SW12-4] collected in beach drift
<b>ANABATHRIDAE</b>	
<i>Amphithalamus (Amphithalamus) inclusus</i> Carpenter, 1865	Tamarindo Bay [SW12-4] collected in beach drift
<i>Amphithalamus (Amphithalamus) tennis</i> Bartsch, 1911	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>BARLEEIIDAE</b>	
<i>Barleeia paupercula</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Barleeia subtenuis</i> Carpenter, 1864	Tamarindo Bay [SW12-4] collected in beach drift
<b>TORNIDAE</b>	
<i>Cyclostremiscus (Cyclostremiscus) bifrontia</i> Carpenter, 1857	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cyclostremiscus (Cyclostremiscus) panamensis</i> (C.B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Cyclostremiscus (Cyclostremiscus) parvus</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Cyclostremiscus (Cyclostremiscus) panli</i> Pilsbry & Olsson, 1952	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cyclostremiscus (Cyclostremiscus) peruvianus</i> Pilsbry & Olsson, 1945	Playa Avellana [SW12-5] collected in rubble under rock
<i>Lydipnus (Cymatoplyx) strongi</i> Pilsbry & Olsson, 1952	Tamarindo Bay [SW12-4] collected in beach drift
<i>Parviturboides germanus</i> (Pilsbry & Olsson, 1945)	Playa Avellana [SW12-5] in rubble under rock
<i>Parviturboides monile</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Solariorbis (Hapalorbis) distropis</i> Pilsbry & Olsson, 1952	Playa Avellana [SW12-5] collected in rubble under rock
<i>Teinostoma (Pseudorotella) ecuadorianum</i> Pilsbry & Olsson, 1941	Playa Avellana [SW12-5] in rubble under rock
<i>Macromphalina dipsycha</i> (Pilsbry & Olsson, 1945)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Macromphalina immersiceps</i> (Pilsbry & Olsson, 1945)	Tamarindo Bay [SW12-4] collected in beach drift
<b>CAECIDAE</b>	
<i>Caecum (Caecum) clathratum</i> Carpenter, 1857	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Caecum (Caecum) diminutum</i> C. B. Adams, 1852	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Caecum (Caecum) eburneum</i> C. B. Adams, 1852	Playa Avellana [SW12-5] collected in rubble under rock
<i>Caecum (Caecum) firmatum</i> C. B. Adams, 1852	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Caecum (Caecum) parvum</i> C. B. Adams, 1852	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Caecum (Caecum) pygmaeum</i> C. B. Adams, 1852	Playa Avellana [SW12-5] collected in rubble under rock
<i>Elephantulum insculptum</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Fartulum (Fartulum) sp.</i>	Playa Avellana [SW12-5] in rubble under rock
<b>EPITONIIDAE</b>	
<i>Epitonium (Asperiscala) emydonesus</i> Dall, 1917	Tamarindo Bay [SW12-4] collected in beach drift

<b>EULIMIDAE</b>	
<i>Eulima (Eulima) recta</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Hemiliostraca</i> sp.	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Melanella bipartita</i> Mörch, 1859	Playa Avellana [SW12-5] in rubble under rock
<i>Melanella panamensis</i> (Bartsch, 1917)	Playa Avellana [SW12-5] in rubble under rock
<i>Melanella solitaria</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift
<b>STROMBIDAE</b>	
<i>Tricornis galeatus</i> Swainson, 1823	Playa Avellana [SW12-5] observed on rocks
<b>HIPPONICIDAE</b>	
<i>Hipponix antiquatus panamensis</i> C. B. Adams, 1852	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Hipponix grayanus</i> Menke, 1853	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Pilosabia pilosa</i> (Deshayes, 1832)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>CALYPTRAEIDAE</b>	
<i>Calyptraea (Calyptraea) mamillaris</i> Broderip, 1834	Tamarindo Bay [SW12-4] collected in beach drift
<i>Cheilea cepacea</i> (Broderip, 1834)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Crepidula aculeata</i> (Gmelin, 1791)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Crepidula arenata</i> (Broderip, 1834)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Crepidula excavata</i> (Broderip, 1834)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Crepidula lessonii</i> (Broderip, 1834)	Tamarindo Bay [SW12-4] observed on rocks
<i>Crepidula rostrata</i> C. B. Adams, 1852	Tamarindo Bay [SW12-4] collected in beach drift
<i>Crepipatella dorsata</i> (Broderip, 1834)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Crucibulum (Crucibulum) monticulus</i> Berry, 1969	Tamarindo Bay [SW12-4] collected in beach drift
<b>TRIVIIDAE</b>	
<i>Hesperato columbella</i> Menke, 1847	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] observed under rock
<i>Hesperato scabriuscula</i> Sowerby, 1832	Playa Avellana [SW12-5] observed on rocks
<b>CYPRAEIDAE</b>	
<i>Macrocypraea cervinetta</i> Kiener, 1843	Playa Avellana [SW12-5] observed on rocks
<i>Mauritia arabicula</i> (Lamarck, 1811)	Playa Avellana [SW12-5] observed on rocks
<i>Jenneria pustulata</i> (Lightfoot, 1786)	Playa Avellana [SW12-5] observed on rocks
<b>NATICIDAE</b>	
<i>Natica (Natica) chemnitzii</i> Pfeiffer, 1840	Tamarindo Bay [SW12-4] collected in beach drift
<i>Natica (Natica) grayi</i> Philippi, 1852	Tamarindo Bay [SW12-4] collected in beach drift
<b>TONNIDAE</b>	
<i>Cypraeocassis (Levenia) coarctata</i> (Sowerby, 1825)	Playa Avellana [SW12-5] observed on rocks
<b>RANELLIDAE</b>	
<i>Cymatium (Monoplex) vestitum</i> (Hinds, 1844)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] observed under rock
<i>Cymatium (Monoplex) lignarium</i> (Broderip, 1833)	Playa Avellana [SW12-5] observed on rocks
<b>BURSIDAE</b>	
<i>Bursa (Colubrellina) corrugata corrugata</i> (Perry, 1811)	Playa Avellana [SW12-5] observed on rocks

<b>MURICIDAE</b>	
<i>Muricanthus princeps</i> (Broderip, 1833)	Playa Avellana [SW12-5] observed on rocks
<i>Aspella (Aspella) pyramidalis</i> (Broderip, 1833)	Playa Avellana [SW12-5] observed on rocks
<i>Muricopsis (Muricopsis) zeteki</i> Hertlein & Strong, 1951	Tamarindo Bay [SW12-4] in beach drift, Playa Avellana [SW12-5] observed on rock
<i>Favartia (Caribiella) erosa</i> (Broderip, 1833)	Playa Avellana [SW12-5] observed on rocks
<i>Murexiella lappa</i> (Broderip, 1833)	Tamarindo Bay [SW12-4] observed on rocks
<i>Stramonita biseralis</i> (Blainville, 1832)	Tamarindo Bay [SW12-4] observed on rocks
<i>Vasula melones</i> (Duclos, 1832)	Playa Avellana [SW12-5] observed on rocks
<i>Morula (Morunella) lugubris</i> (C. B. Adams, 1852)	Playa Avellana [SW12-5] observed on rocks
<b>TRIPTEROTYPHIDAE</b>	
<i>Tripterotyphis lowei</i> (Pilsbry, 1931)	Playa Avellana [SW12-5] observed on rocks
<b>CYSTISCIDAE</b>	
<i>Persicula imbricata</i> (Hinds, 1844)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Persicula phrygia</i> (Sowerby, 1846)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Gibberula minor</i> (C. B. Adams, 1852)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Gibberula polita</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Granulina margaritula</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>MITRIDAE</b>	
<i>Mitra (Strigatella) lens</i> Wood, 1828	Playa Avellana [SW12-5] observed on rocks
<i>Mitra (Strigatella) tristis</i> Broderip, 1836	Playa Avellana [SW12-5] in rubble under rock
<b>TURBINELLIDAE</b>	
<i>Vasum caestus</i> (Broderip, 1833)	Playa Avellana [SW12-5] observed on rocks
<b>COLUMBELLIDAE</b>	
<i>Columbella fuscata</i> Sowerby, 1832	Playa Avellana [SW12-5] observed on rocks
<i>Columbella labiosa</i> Sowerby, 1833	Playa Avellana [SW12-5] observed on rocks
<i>Columbella sonsonatensis</i> (Mörch, 1860)	Tamarindo Bay [SW12-4] in beach drift, Playa Avellana [SW12-5] observed on rock
<i>Columbella strombiformis</i> Lamarck, 1822	Playa Avellana [SW12-5] observed on rocks
<i>Costanachis hilli</i> (Pilsbry & Lowe, 1932)	Playa Avellana [SW12-5] observed on rocks
<i>Costanachis lentignosa</i> (Hinds, 1844)	Tamarindo Bay [SW12-4] in beach drift, Playa Avellana [SW12-5] observed on rock
<i>Costanachis spadicea</i> (Philippi, 1846)	Tamarindo Bay [SW12-4] observed in beach drift, Playa Avellana [SW12-5] collected under rock
<i>Costoanachis fluctuata</i> (Sowerby, 1832)	Playa Avellana [SW12-5] observed on rocks
<i>Parvanachis albonodosa</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Parvanachis pygmaea</i> (Sowerby, 1832)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Mitrella guttata</i> (Sowerby, 1832)	Playa Avellana [SW12-5] in rubble under rock
<i>Mitrella ocellata</i> (Gmelin, 1791)	Playa Avellana [SW12-5] observed on rocks
<i>Steironepion melanosticta</i> (Pilsbry & Lowe, 1932)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Steironepion tincta</i> (Carpenter, 1864)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Zanassarina cruentata</i> (Mörch, 1860)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected under rock

<b>BUCCINIDAE</b>	
<i>Bailya anomala</i> (Hinds, 1844)	Tamarindo Bay [SWI2-4] in beach drift, Playa Avellana [SWI2-5] observed on rock
<i>Engina maura</i> (Sowerby, 1832)	Playa Avellana [SWI2-5] observed on rocks
<i>Cantharus (Pollia) sanguinolentus</i> (Duclos, 1833)	Playa Avellana [SWI2-5] observed on rocks
<b>FASCIOLARIIDAE</b>	
<i>Lencozonia cerata</i> (Wood, 1828)	Playa Avellana [SWI2-5] observed on rocks
<i>Opeatostoma pseudodon</i> (Burrow, 1815)	Playa Avellana [SWI2-5] observed on rocks
<b>OLIVIDAE</b>	
<i>Olivella (Olivella) gracilis</i> (Broderip & Sowerby, 1829)	Tamarindo Bay [SWI2-4] observed on rocks
<i>Olivella (Olivella) tergina</i> (Duclos, 1835)	Tamarindo Bay [SWI2-4] collected in beach drift, Playa Avellana [SWI2-5] in rubble under rock
<i>Olivella cf. anazora</i> (Duclos, 1835)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Olivella (Niteoliva) morrisoni</i> Olsson, 1956	Tamarindo Bay [SWI2-4] observed on rocks
<i>Olivella (Pachyoliva) semistriata</i> (Gray, 1839)	Tamarindo Bay [SWI2-4] collected in beach drift
<b>TURRIDAE</b>	
<i>Crassispira (Dallispira) cerithoidea</i> (Carpenter, 1857)	Playa Avellana [SWI2-5] observed on rocks
<i>Pilsbryspira (Pilsbryspira) aterrima</i> (Sowerby, 1834)	Playa Avellana [SWI2-5] in rubble under rock
<b>CONIDAE</b>	
<i>Clathurella rava</i> (Hinds, 1843)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Microdaphne trichodes</i> (Dall, 1919)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Chelyconus purpurascens</i> Sowerby, 1833	Playa Avellana [SWI2-5] observed on rocks
<i>Stephanoconus nux</i> Broderip, 1833	Playa Avellana [SWI2-5] observed on rocks
<b>MANGELIIDAE</b>	
<i>Tenaturris merita</i> (Hinds, 1843)	Playa Avellana [SWI2-5] observed on rocks
<i>Notocytharella striosa</i> (C. B. Adams, 1852)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Agathotoma (Agathotoma) camarina</i> (Dall, 1919)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Agathotoma (Agathotoma) finitima</i> (Pilsbry & Lowe, 1932)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Agathotoma (Agathotoma) neglecta</i> (C. B. Adams, 1852)	Playa Avellana [SWI2-5] in rubble under rock
<i>Agathotoma (Agathotoma) quadriseriata</i> (Dall, 1919)	Playa Avellana [SWI2-5] collected in rubble under rock
<i>Agathotoma (Agathotoma) stellata</i> (Mörch, 1860)	Tamarindo Bay [SWI2-4] collected in beach drift
<b>HETEROBRACHIA</b>	
<b>ARCHITECTONICIDAE</b>	
<i>Heliacus (Torinista) planispira</i> Pilsbry & Lowe, 1932	Tamarindo Bay [SWI2-4] collected in beach drift
<b>PYRAMIDELLIDAE</b>	
<i>Iselica maculosa</i> (Carpenter, 1857)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Chrysallida inconspicua</i> (C. B. Adams, 1852)	Playa Avellana [SWI2-5] in rubble under rock
<i>Chrysallida ovata</i> Carpenter, 1857	Playa Avellana [SWI2-5] in rubble under rock
<i>Chrysallida rotundata</i> (Carpenter, 1857)	Playa Avellana [SWI2-5] in rubble under rock
<i>Chrysallida torrita</i> Dall & Bartsch, 1909	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Chrysallida tyleri</i> Dall & Bartsch, 1909	Playa Avellana [SWI2-5] in rubble under rock
<i>Chrysallida vizcainoana</i> Baker, Hanna & Strong, 1938	Tamarindo Bay [SWI2-4] collected in beach drift, Playa Avellana [SWI2-5] in rubble under rock
<i>Pseudoscilla exarata</i> (Carpenter, 1857)	Tamarindo Bay [SWI2-4] collected in beach drift
<i>Liamorpha armata</i> (Carpenter, 1857)	Tamarindo Bay [SWI2-4] collected in beach drift, Playa Avellana [SWI2-5] collected in rubble under rock

<b>BULLIDAE</b>	
<i>Bulla (Bulla) punctulata</i> A. Adams in Sowerby, 1850	Tamarindo Bay [SW12-4] observed on rocks
<b>HAMINOEIDAE</b>	
<i>Haminoea angelensis</i> Baker & Hanna, 1927	Playa Avellana [SW12-5] collected in rubble under rock
<b>CYLICHNIDAE</b>	
<i>Cylichna veteronis</i> Strong & Hertlein, 1939	Tamarindo Bay [SW12-4] collected in beach drift
<b>RETUSIDAE</b>	
<i>Volvella (Volvella) cylindrica</i> (Carpenter, 1864)	Tamarindo Bay [SW12-4] collected in beach drift
<b>SIPHONARIIDAE</b>	
<i>Siphonaria (Heterosiphonaria) gigas</i> Sowerby, 1825	Tamarindo Bay [SW12-4] observed on rocks
<i>Siphonaria (Heterosiphonaria) palmata</i> Carpenter, 1857	Tamarindo Bay [SW12-4] collected in beach drift; Playa Avellana [SW12-5] collected under rock
<b>DENTALIIDAE</b>	
<i>Dentalium (Graptacme) seinipolitum</i> Broderip & Sowerby, 1829	Tamarindo Bay [SW12-4] collected in beach drift
<i>Dentalium (Tesseracme) tesseragonum</i> Sowerby, 1832	Tamarindo Bay [SW12-4] collected in beach drift
<i>Fustiaria (Laevidentalium) splendida</i> (Sowerby, 1832)	Tamarindo Bay [SW12-4] collected in beach drift
<b>SIPHONODENTALIIDAE</b>	
<i>Cadulus (Platyschides) austinchloris</i> Emerson, 1951	Tamarindo Bay [SW12-4] collected in beach drift
<b>BIVALVIA</b>	
<b>PROTOBRANCHIA</b>	
<b>NUCULIDAE</b>	
<i>Nucula (Nucula) declivis</i> Hinds, 1843	Tamarindo Bay [SW12-4] collected in beach drift
<b>NUDULANIDAE</b>	
<i>Saccella acapulcensis</i> (Pilsbry & Lowe, 1932)	Tamarindo Bay [SW12-4] collected in beach drift
<b>AUTOBRANCHIA</b>	
<b>MYTILIDAE</b>	
<i>Brachidontes adamsianus</i> (Dunker, 1857)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Brachidontes playasensis</i> (Pilsbry & Olsson, 1935)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Brachidontes puntarenensis</i> (Pilsbry & Lowe, 1932)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<i>Crenella decussata</i> (Montagu, 1808)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Septifer zeteki</i> Hertlein & Strong, 1946	Tamarindo Bay [SW12-4] collected in beach drift
<b>ARCIDAE</b>	
<i>Acar rostae</i> (Berry, 1954)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Arca mutabilis</i> (Sowerby, 1833)	Playa Avellana [SW12-5] observed on rocks
<b>NOETIIDAE</b>	
<i>Arcopsis solida</i> (Sowerby, 1833)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] collected in rubble under rock
<b>PTERIIDI</b>	
<i>Pinctada mazatlanica</i> (Hanley, 1856)	Playa Avellana [SW12-5] observed on rocks
<b>OSTREIDAE</b>	
<i>Myraeena angelica</i> (Rochebrune, 1895)	Playa Avellana [SW12-5] observed on rocks
<b>LUCINIDAE</b>	
<i>Ctena galapagana</i> (Dall, 1901)	Tamarindo Bay [SW12-4] collected in beach drift



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<i>Ctena mexicana</i> (Dall, 1901)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Divalinga perparvula</i> (Dall, 1901)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Parvilucina mazatlanica</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift
<b>CARDITIDAE</b>	
<i>Carditamera radiata</i> (Sowerby, 1833)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Strophocardia megastropha</i> (Gray, 1825)	Playa Avellana [SW12-5] observed on rocks
<b>CONDYLOCARDIIDAE</b>	
<i>Condylocardia hippopus</i> (Mörch, 1861)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Condylocardia sparsa</i> Coan, 2003	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>CRASSATELLIDAE</b>	
<i>Crassinella ecuadoriana</i> Olsson, 1961	Playa Avellana [SW12-5] in rubble under rock
<b>CARDIIDAE</b>	
<i>Apiocardia obovale</i> (Sowerby, 1833)	Tamarindo Bay [SW12-4] collected in beach drift
<i>Laevicardium substratum</i> (Conrad, 1837)	Tamarindo Bay [SW12-4] collected in beach drift
<b>CHAMIDAE</b>	
<i>Chama echinata</i> Broderip, 1835	Playa Avellana [SW12-5] observed on rocks
<b>LASEAIDAE</b>	
<i>Kellia suborbicularis</i> (Montagu, 1803)	Playa Avellana [SW12-5] in rubble under rock
<b>TELLINIDAE</b>	
<i>Strigilla (Strigilla) dichotoma</i> (Philippi, 1846)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Tellina (Moerella) coani</i> Keen, 1971	Tamarindo Bay [SW12-4] collected in beach drift
<b>DONACIDAE</b>	
<i>Donax (Chion) ecuadorianus</i> Olsson, 1961	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>VENERIDAE</b>	
<i>Nutricola humilis</i> Carpenter, 1857	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<i>Trauseniuella puello</i> (Carpenter, 1864)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock
<b>PETRICOLIDAE</b>	
<i>Petricola (Petricola) linguafelis</i> (Carpenter, 1857)	Tamarindo Bay [SW12-4] collected in beach drift, Playa Avellana [SW12-5] in rubble under rock